CLAIMS

Sub A1

1. A rotating asynchronous converter for connection of AC networks with equal or different frequencies, wherein the converter comprises a first stator connected to a first AC network with a first frequency f_1, and a second stator connected to a second AC network with a second frequency f_2, **characterized in** that the converter also comprises a rotor means which rotates in dependence of the first and second frequencies f_1, f_2, and in that at least one of said stators each comprises at least one winding, wherein each winding comprises at least one current-carrying conductor, and each winding comprises an insulation system, which comprises on the one hand at least two semiconducting layers, wherein each layer constitutes substantially an equipotential surface, and on the other hand between them is arranged a solid insulation.

Sub C17 cont.

a 2. The rotating asynchronous converter according to Claim 1, wherein ~~characterized in that~~ at least one of said semiconducting layers has in the main equal thermal expansion coefficient as said solid insulation.

a 3. The rotating asynchronous converter according to Claim 2, wherein ~~characterized in that~~ the potential of the inner one of said layers is substantially equal to the potential of the conductor.

Sub A2

4. The rotating asynchronous converter according to Claim 2 or 3, **characterized in** that an outer one of said layers is arranged to constitute substantially an equipotential surface surrounding said conductor.

a 5. The rotating asynchronous converter according to claim 4, wherein ~~characterized in that~~ said outer layer is connected to a specific potential.

a 6. The rotating asynchronous converter according to Claim 5, wherein ~~characterized in that~~ said specific potential is ground potential.

Sub A3

7. The rotating asynchronous converter according to any one of the Claims 1, 2, 3, 4, 5, or 6, **characterized in**

that at least two of said layers have substantially equal thermal expansion coefficients.

8. The rotating asynchronous converter according to any one of the preceding Claims, **characterized in** that said current-carrying conductor comprises a number of strands, only a minority of said strands being non-isolated from each other.

9. The rotating asynchronous converter according to any one of the preceding Claims, **characterized in** that each of said two layers and said solid insulation is fixed connected to adjacent layer or solid insulation along substantially the whole connecting surface.

10. A rotating asynchronous converter for connection of AC networks with equal or different frequencies, wherein the converter comprises a first stator connected to a first AC network with a first frequency f_1, and a second stator connected to a second AC network with a second frequency f_2, **characterized in** that the converter also comprises a rotor means which rotates in dependence of said first and second frequencies f_1, f_2, and in that said stators each comprises at least one winding, wherein each winding comprises a cable comprising at least one current-carrying conductor,

- each conductor comprises a number of strands
- around said conductor is arranged an inner semiconducting layer,
- around said inner semiconducting layer is arranged an insulating layer of solid insulation, and
- around said insulating layer is arranged an outer semiconducting layer.

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11. The rotating asynchronous converter according to Claim ~~10~~ 55, wherein ~~characterized in that~~ said cable also comprises a metal shield and a sheath.

Sub(47) a

12. The rotating asynchronous converter according to Claim 11, wherein ~~characterized in that~~ the cable has a diameter comprised in the approximate interval 20-250 mm and a conductor area comprised in the approximate interval 80-3000 mm^2.

Sub A4

13. The rotating asynchronous converter according to any one of Claims 1-12, **characterized in** that said rotor means comprises two electrically and mechanically connected rotors, which are concentrically arranged in respect of said stators.

Sub C4 cont.

14. The rotating asynchronous converter according to Claim 13, wherein ~~characterized in that~~ said converter also comprises an auxiliary device connected to said rotors for starting up of the rotors to a suitable rotation speed before connection of said converter.

a

15. The rotating asynchronous converter according to Claim 14, wherein ~~characterized in that~~ said rotors each comprises a low voltage winding, and in that said rotors are rotating with the frequency $(f_1-f_2)/2$ and the stator current has the frequency $(f_1+f_2)/2$ when said converter is in operation.

Sub A5

16. The rotating asynchronous converter according to any one of Claims 1-11, **characterized in** that said rotor means comprises only one rotor concentrically arranged in respect of said stators.

Sub C47 cont, a

17. The rotating asynchronous converter according to Claim 16, wherein ~~characterized in that~~ said rotor comprises a first loop of wire and a second loop of wire, wherein said loops of wire are connected to each other and are arranged opposite each other on said rotor and separated by two sectors, wherein each sector has an angular width of α.

a

18. The rotating asynchronous converter according to Claim 17, wherein ~~characterized in that~~ said converter also comprises an auxiliary device connected to said rotor for starting up of the rotor to a suitable rotational speed before connection of said converter, and in that said rotor is rotating with the frequency $f_R = \frac{\pi-\alpha}{\pi} \cdot \frac{\Delta f}{4}$,

wherein $\Delta f = |f_1-f_2|$.

19. A rotating asynchronous converter for connection of AC networks with equal or different frequencies, wherein the converter comprises a first stator connected to a first AC network with a first frequency f_1, and a second

stator connected to a second AC network with a second frequency f_2, wherein ~~characterized in that~~ the converter also comprises a rotor means which rotates in dependence of the first and second frequencies f_1, f_2, and in that said stators each comprises at least one winding, wherein each winding comprises at least one current-carrying conductor, and also comprising an insulation system, which in respect of its thermal and electrical properties permits a voltage level in said rotating asynchronous converter exceeding 36 kV.

20. A generator device with variable rotational speed, wherein the generator device comprises a stator connected to an AC network with a frequency f_2, a first cylindrical rotor connected to a turbine, which rotates with a frequency f_1, wherein ~~characterized in that~~ said generator device also comprises a rotor means which rotates in dependence of the frequencies f_1, f_2, and in that said stator and said first cylindrical rotor each comprises at least one winding, wherein each winding comprises at least one current-carrying conductor, and each winding comprises an insulation system, which comprises on the one hand at least two semiconducting layers, wherein each layer constitutes substantially an equipotential surface, and on the other hand between them is arranged a solid insulation.

21. The generator device according to Claim 20, ~~characterized in that~~ wherein at least one of said semiconducting layers has in the main equal thermal expansion coefficient as said solid insulation.

22. The generator device according to Claim 21, ~~characterized in that~~ wherein the potential of the inner one of said layers is substantially equal to the potential of the conductor.

Sub A6

23. The generator device according to Claim 21 or 22, **characterized in** that an outer one of said layers is arranged to constitute substantially an equipotential surface surrounding said conductor.

Sub C4 a cont.

24. The generator device according to Claim 23, ~~characterized in that~~ wherein said outer layer is connected to a specific potential.

a 25. The generator device according to Claim 24, ~~characterized in that~~ wherein said specific potential is ground potential.

a 26. The generator device according to any one of Claims 20-25, ~~characterized in that~~ wherein at least two of said layers have substantially equal thermal expansion coefficients.

Sub A7

27. The generator device according to any one of Claims 20-26, **characterized in** that said current-carrying conductor comprises a number of strands, only a minority of said strands being non-isolated from each other.

28. The generator device according to any one of claims 20-27, **characterized in** that each of said two layers and said solid insulation is fixed connected to adjacent layer or solid insulation along substantially the whole connecting surface.

Sub C4 cont.

29. A generator device with variable rotational speed, wherein the generator device comprises a stator connected to an AC network with a frequency f2, a first cylindrical rotor connected to a turbine, which rotates with a frequency f_1, ~~characterized in that~~ wherein said generator device also comprises a rotor means which rotates in dependence of the frequencies f_1, f_2, and in that said stator and said first cylindrical rotor each comprises at least one winding, wherein each winding comprises a cable comprising at least one current-carrying conductor, a

- each conductor comprises a number of strands,
- around said conductor is arranged an inner semiconducting layer,
- around said inner semiconducting layer is arranged an insulating layer of solid insulation, and
- around said insulating layer is arranged an outer semiconducting layer.

a 30. The generator device according to Claim 29, ~~characterized in that~~ wherein said cable also comprises a metal shield and a sheath.

Sub C5 cont a

31. The generator device according to Claim 30, ~~characterized in that~~ wherein the cable has a diameter comprised in the approximate interval 20-250 mm and a conductor area comprised in the approximate interval 80-3000 mm^2.

Sub A8

32. The generator device according to any one of Claims 20-31, **characterized in** that said rotor means comprises two electrically and mechanically connected rotors, wherein said rotors are hollow and arranged concentrically around said stator and said cylindrical rotor.

Sub C5 cont a

33. The generator device according to Claim 32, ~~characterized in that~~ wherein said rotors of said rotor means each comprises a low voltage winding, and in that said rotor is rotating with the frequency $(f_1-f_2)/2$ when said generator device is in operation.

34. The generator device according to Claim 33, a ~~characterized in that~~ wherein said stator has a cylindrical shape.

Sub A9

35. The generator device according to any one of Claims 20-31, **characterized in** that said rotor means comprises a first rotor and a second rotor, which rotors are electrically and mechanically connected, wherein said first rotor is hollow and arranged concentrically around said first cylindrical rotor, and said second rotor is cylindrical.

Sub C6

36. The generator device according to Claim 35, a ~~characterized in that~~ wherein said first and second rotors of said rotor means each comprises a low voltage winding, and in that said first and second rotors are rotating with the frequency $(f_1-f_2)/2$ when said generator device is in operation.

37. The generator device according to Claim 36, a ~~characterized in that~~ wherein said stator is hollow and arranged around said second rotor.

Sub A10

38. The use of a rotating asynchronous converter in accordance with any one of Claims 1-19 for connection of not synchronous three phase networks with equal rating frequencies.

~~39. The use of a rotating asynchronous converter in accordance with any one of Claims 1-19 for connection of three phase networks with different frequencies.~~

~~40. The use of a rotating asynchronous converter in accordance with any one of Claims 1-19 as a series compensation in long distance AC transmission.~~

~~41. The use of a rotating asynchronous converter in accordance with any one of Claims 1-19 for reactive power compensation.~~

Add All

Add B2